IN THE CLAIMS

Please cancel claims 1-30, and 32-50 without prejudice, and add new claims 51-100 as follows:

Claims 1-30 (Cancelled)

31. (Previously Presented) A method of photorealistic image synthesis utilizing interval-based techniques for integrating digital scene information comprising the steps of:

a. executing an interval analysis upon input parameters of an image frame so as to compute a visible solution set of an area not exceeding a pixel dimension for a pixel of an array of pixels that form said image frame;

b. computing said visible solution set of the area not exceeding the pixel dimension for the pixel of the array of pixels that form said image frame; and,

c. inputting said visible solution set of the area not exceeding the pixel dimension for the pixel of the array of pixels that form said image frame to a user defined shading function in furtherance of quantitatively assigning a character to the pixel.

Claims 32-50 (Cancelled)

51. (New) The method of claim 31 wherein said array of pixels that form said image frame is characterized by a screen or pixel coordinate system.

52. (New) The method of claim 51 wherein said screen or pixel coordinate system of said image frame is further characterized by at least one additional dimension.

53. (New) The method of claim 52 wherein said at least one additional dimension is selected from the group consisting of depth, time, or aperture.

54. (New) The method of claim 51 wherein an interval bisection of said screen or pixel coordinate system is executed.

55. (New) The method of claim 51 wherein a preferential interval subdivision of said screen or pixel coordinate system is performed.

56. (New) The method of claim 31 wherein said user defined shading function is nonlinear.

57. (New) The method of claim 31 wherein said user defined shading function is an interval function.

58. (New) The method of claim 31 wherein said input parameters comprise an interval function.

59. (New) The method of claim 31 wherein said input parameters comprise a geometric function.

60. (New) The method of claim 31 wherein said input parameters comprise a nonlinear geometric function.

61. (New) The method of claim 31 wherein said input parameters comprise a geometric function comprising a projection of a set of parametric variables into a screen or pixel coordinate system of said array of pixels that form said image frame.

62. (New) The method of claim 31 wherein said input parameters comprise a geometric function comprising a zero-set implicit function of a screen or pixel coordinate system of said array of pixels that form said image frame.

63. (New) The method of claim 61 wherein parametric variables of said set of parametric variables comprise intervals representing unknown parametric space to be assessed in furtherance of visible solution set computation.

64. (New) The method of claim 61 wherein an error-bounded projection of parametric variables of said set of parametric variables of said geometric function into said screen or pixel coordinate system is computed.

65. (New) The method of claim 61 wherein parametric variables of said set of parametric variables are selectively contracted.

66. (New) The method of claim 65 wherein said contraction of said parametric variables comprises a narrowing of interval width of at least one of said parametric variables.

67. (New) The method of claim 66 wherein said narrowing of interval width comprises an interval bisection of at least one of said parametric variables.

68. (New) The method of claim 66 wherein the narrowed interval width of at least one of said parametric variables is input in furtherance of computation of a visible solution set of said screen or pixel coordinate system.

69. (New) The method of claim 64 wherein a partitioning of an x-y area of said screen or pixel coordinate system is executed.

70. (New) The method of claim 69 wherein said *x-y* area represents at least a portion of said array of pixels.

71. (New) The method of claim 69 wherein said *x-y* area represents a pixel of pixels of said array of pixels.

72. (New) The method of claim 69 wherein said *x-y* area is further characterized by at least one additional dimension.

73. (New) The method of claim 72 wherein said partitioning of said *x-y* area further comprises a partitioning of said at least one additional dimension.

74. (New) The method of claim 72 wherein said at least one additional dimension comprises a depth dimension.

75. (New) The method of claim 69 wherein said partitioning defines a plurality of non-overlapping *x-y* area tiles.

76. (New) The method of claim 75 wherein an *x-y* area tile of said plurality of non-overlapping *x-y* area tiles is assessed for intersection with said error-bounded projection.

77. (New) The method of claim 76 wherein a negative intersection

assessment results in discarding said error-bounded projection and said parametric variables from a visible solution set of said *x-y* area tile.

78. (New) The method of claim 76 wherein a positive intersection assessment results in execution of an acceptance test for said error-bounded projection of said parametric variables of said *x-y* area tile.

79. (New) The method of claim 78 wherein said acceptance test involves comparison of said *x-y* area tile or said error-bounded projection to a pixel coordinate system unit, or a subunit thereof.

80. (New) The method of claim 78 wherein acceptance criteria for said acceptance test is specified by a user.

81. (New) The method of claim 78 wherein a negative acceptance test results in inputting said parametric variables for further computation of a visible solution set for said *x-y* area tile.

82. (New) The method of claim 78 wherein a positive acceptance test results in addition of said error-bounded projection and said parametric variables to a visible solution set of said *x-y* area tile.

83. (New) The method of claim 82 wherein said visible solution set is input to said user defined shading function in furtherance of quantitatively assigning a character to a pixel.

84. (New) The method of claim 62 wherein a partitioning of an *x-y* area of said screen or pixel coordinate system is executed.

85. (New) The method of claim 84 wherein said *x-y* area represents at least a portion of said array of pixels.

86. (New) The method of claim 84 wherein said *x-y* area represents a pixel of pixels of said array of pixels.

87. (New) The method of claim 84 wherein said *x-y* area is further characterized by at least one additional dimension.

88. (New) The method of claim 87 wherein said partitioning of said *x-y* area further comprises a partitioning of said at least one additional dimension.

89. (New) The method of claim 87 wherein said at least one additional dimension is selected from the group consisting of depth, time, or aperture.

90. (New) The method of claim 84 wherein said partitioning defines a plurality of non-overlapping *x-y* area tiles.

91. (New) The method of claim 90 wherein an *x-y* area tile of said plurality of non-overlapping *x-y* area tiles is input to said zero-set implicit function to compute an error-bounded result.

92. (New) The method of claim 91 wherein said error-bounded result is assessed for intersection with zero.

93. (New) The method of claim 92 wherein a negative intersection assessment results in discarding said *x-y* area tile from a visible solution set of said image frame.

94. (New) The method of claim 92 wherein a positive intersection assessment results in execution of an acceptance test for said *x-y* area tile.

95. (New) The method of claim 94 wherein said acceptance test involves comparison of said *x-y* area tile to a pixel coordinate system unit, or a subunit thereof.

96. (New) The method of claim 94 wherein acceptance criteria for said acceptance test is specified by a user.

97. (New) The method of claim 94 wherein a negative acceptance test results in further computation of a visible solution set for said *x-y* area tile.

98. (New) The method of claim 94 wherein a positive acceptance test results in addition of said *x-y* area tile to a visible solution set of said image frame.

99. (New) The method of claim 98 wherein said visible solution set is input to said user defined shading function in furtherance of quantitatively assigning a character to a pixel.

100. (New) A computer readable storage medium storing instructions that when executed by a computer cause the computer to perform a method of photorealistic image synthesis utilizing interval-based techniques for integrating digital scene information within a computer system, the method comprising:

a. executing an interval analysis upon input parameters of an image frame so as to compute a visible solution set of an area not exceeding a pixel dimension for a pixel of an array of pixels that form said image frame;

b. computing said visible solution set of the area not exceeding the pixel dimension for the pixel of the array of pixels that form said image frame; and,

c. inputting said visible solution set of the area not exceeding the pixel dimension for the pixel of the array of pixels that form said image frame to a user defined shading function in furtherance of quantitatively assigning a character to the pixel.